

**MICROELECTRONIC PACKAGES INCLUDING NANOCOMPOSITE  
DIELECTRIC BUILD-UP MATERIALS AND NANOCOMPOSITE  
SOLDER RESIST**

**ABSTRACT OF THE DISCLOSURE**

This application discloses an apparatus comprising a substrate including a plurality of conducting layers and a nanocomposite inter-layer dielectric (ILD) sandwiched between the conducting layers, wherein the nanocomposite ILD layer comprises a nanocomposite including a polymer having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio. Also disclosed is an apparatus comprising a substrate having a contact surface and a nanocomposite solder resist layer placed on the contact surface, wherein the solder resist comprises a nanocomposite including a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio. Further disclosed is a process comprising providing a plurality of conducting layers and sandwiching a nanocomposite inter-layer dielectric (ILD) between the conducting layers, wherein the nanocomposite ILD layer comprises a nanocomposite including a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio. Other apparatus and process embodiments are also disclosed and claimed.